Expert consensus on the development of a school-based intervention to improve the school participation and connectedness of elementary students on the autism spectrum: A Delphi study.

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Abstract

School participation and connectedness has significant implications on student outcomes while at school and in later life. The need to develop evidence-based interventions to proactively support students with Autism Spectrum Disorder (ASD) is imperative. A two-round Delphi technique was used to gain expert consensus to inform the development of a school-based intervention to improve the school participation and connectedness of elementary students with ASD. Seventy-six expert clinicians, educators and researchers completed round one and 65 completed a second round. Consensus was achieved on the application of a conceptual framework of participation in round one, which informed the theoretical rationale of the intervention. Consensus on the importance of proposed classroom modules and the feasibility of proposed intervention techniques was achieved in round two. The process of gaining expert perspectives to develop an evidence-based intervention provides greater confidence that the intervention will be effective in achieving meaningful outcomes for students with ASD.

Key Words: Autism Spectrum Disorder; elementary; intervention; inclusion.

Introduction

Being engaged in school related activities helps students to develop important skills, knowledge and values and lays the foundation for future learning and participation (Commonwealth of Australia, 2009). The experiences students have at school have significant implications, not only on students' social, emotional and academic outcomes, but also their outcomes in later life (Newman et al., 2011). Forces that shape and drive student school participation, however, are complex and multifaceted.

The family of participation-related constructs (fPRC) is a conceptual framework that can be used to explore person and environmental factors impacting participation (Imms et al., 2015; Imms et al., 2016). The fPRC was used in this study to guide expert discussions on the application of participation constructs to the school participation of students with ASD, and if deemed important, how these constructs can be targeted in a school-based intervention. Given conceptual inconsistencies related to participation as an outcome, it is important to draw on existing frameworks to ensure consistency in the use of terminology. This was important in this study as experts were sought from a variety of professional backgrounds.

According to the fPRC, participation consists of two components: attendance, defined as being there and involvement, defined as "…the experience of participating while attending" (Imms et al., 2016, p. 18). Intrinsic factors that influence and are influenced by participation include "…activity competence (i.e., the ability to execute an activity), sense of self (i.e., intrapersonal factors related to confidence, satisfaction, self-esteem and self-determination) and preferences (i.e., interests or activities that are valued)" (Imms et al., 2016, p. 18). Active processes between person and environmental factors and participation are illustrated using bi- and uni-directional arrows (see Figure 1) (Imms et al., 2016).

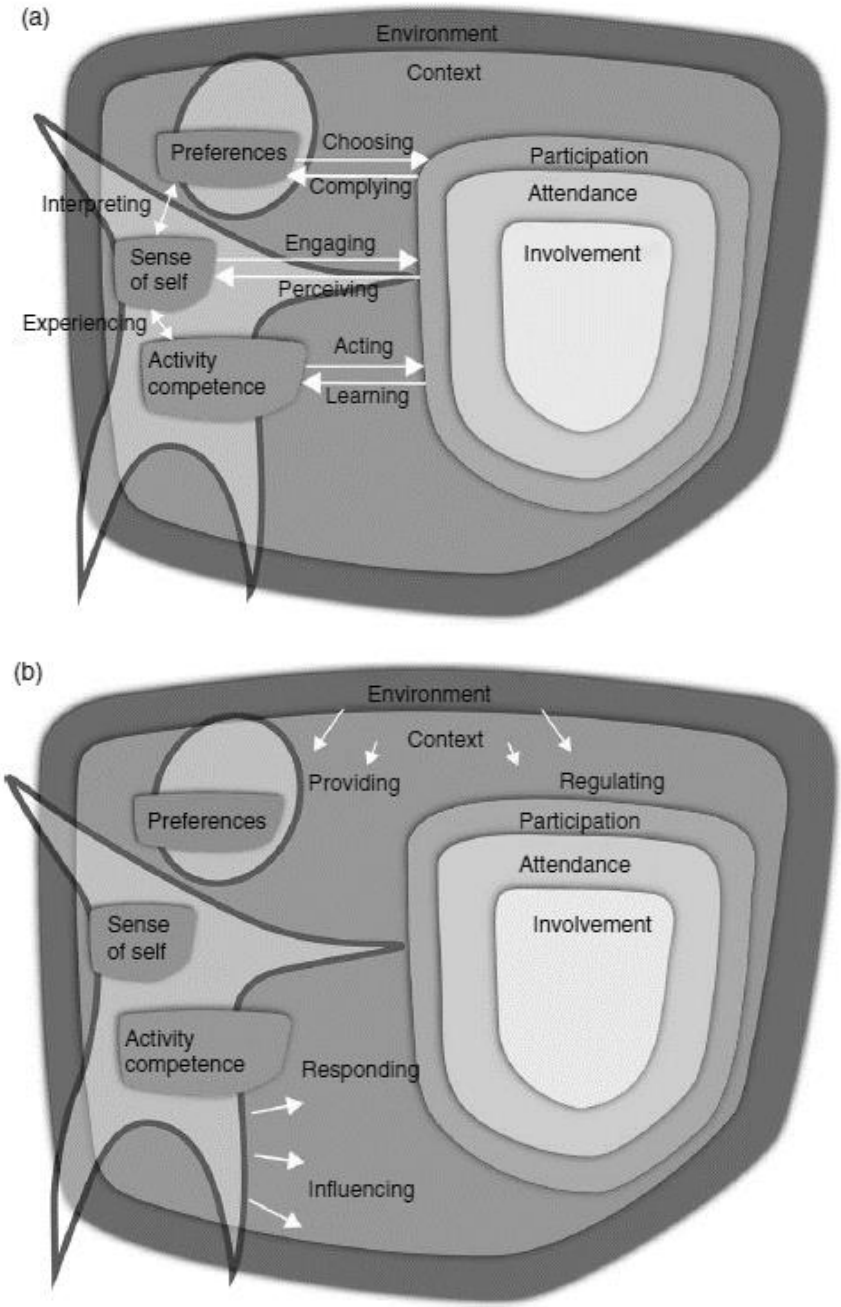

Figure 1. family of Participation-Related Constructs: (a) person-focused processes, (b) environment focused processes. Reprinted from "Participation, both a means and an end: a conceptual analysis of processes and outcomes in childhood disability" by C. Imms and colleagues, 2016, *Developmental Medicine & Child Neurology*, *59*, 16-25. Copyright [2016] by Mac Keith Press. Reprinted with permission.

In the context of school, merely being present in a mainstream classroom does not lead to student participation. Students need to engage in classroom and playground activities, feel motivated and connected to their peers, teachers and school community. They also need to have necessary skills and abilities to participate; a positive sense of self and activities or interests at school that hold meaning to them (Imms et al., 2016). Clinicians, educators and intervention researchers are key stakeholders in the school environment that can support or hinder student participation. The dynamic interplay between person (i.e., student) and environmental (i.e., school) processes can be disrupted by factors such as the presence of a disability or lack of resources in the school environment; leading to participation restrictions.

The participation restrictions of students with Autism Spectrum Disorder (ASD) are widely documented (Saggers, Hwang, & Mercer, 2011). Characteristics of ASD, including difficulty with social emotional reciprocity, impact students' ability to build and maintain relationships with peers and teachers and participate at school (Rotheram-Fuller, Kasari, Chamberlain, & Locke, 2010). These student factors are further compounded by environmental barriers, such as an unsupportive school culture and lack of modification to the curriculum (Batten, Corbett, Rosenblatt, Withers, & Yuille, 2006). Elementary school students with ASD perceive their participation at schooll to be lower and report they are more bullied, less liked, less involved in interaction, and less understood by teachers at school compared to peers (Falkmer, Granlund, Nilholm, & Falkmer, 2012). Reduced school connectedness, defined as "…the extent to which students feel personally accepted, respected, included and supported by others" (Goodenow, 1993, p. 80) in the school social environment, is associated with decreased academic engagement, anxiety and depressive symptomatology (Shochet, Dadds, Ham, & Montague, 2006). While some of the factors impacting the participation of students with ASD are known, the complex interaction between these factors and how they impact student participation and connectedness is yet to

be established. Understanding forces that shape students' school participation, using frameworks such as the fPRC, is imperative so that targeted interventions can be developed, implemented and evaluated in the early school years.

The development of school-based interventions, however, is considered complex due to the presence of several inter-connected components (Craig et al., 2013). The United Kingdom's Medical Research Council (UKMRC) has developed guidelines to provide a systematic, phase-based approach for researchers developing, implementing and evaluating complex interventions (Campbell et al., 2000). These guidelines were used to inform the methodology of a larger research project that aims to develop *and* evaluate the preliminary effectiveness, feasibility and appropriateness of a school-based intervention to improve the school participation and connectedness of elementary school students with ASD. The UKMRC guidelines emphasize the importance of establishing a strong theoretical rationale that demonstrates how and why the intervention is likely to work and the importance of involving legitimate stakeholders in intervention development (Campbell et al., 2000). This ensures the interests of all relevant people are considered, increased buy-in of stakeholders in ensuing research, and greater likelihood of results influencing practice (Mathie et al., 2014).

This study, reports on the actions that led to the *development* of the intervention using a Delphi technique; an iterative, multistage group facilitation process, designed to transform individual opinions into group consensus (Boulkedid, Abdoul, Loustau, Sibony, & Alterti, 2011). Four separate focus groups were conducted by the primary author at Curtin University to gain parent (group 1, n=7; group 2, n=8) and educator (group 3, n=6; group 4, n=5) perspectives on the participation experiences of elementary students with ASD and gain preliminary feedback on the content, delivery and feasibility of the school-based intervention. Focus group data were analyzed thematically and are reported elsewhere (Hodges, Joosten, Bourke-Taylor, & Cordier, 2018). Findings from these focus groups, the fPRC, and a review

of theoretical and empirical literature (Odom et al., 2003; National Autism Center, 2015) informed the development of the first survey and avenues for questioning in both Delphi rounds. The Delphi technique was chosen as it allows many individuals across locations and areas of expertize to be included anonymously and ensures the contribution of each participant is equally recognized, regardless of background or years of experience (Boulkedid et al., 2011). The aim of the Delphi was to gain consensus from experts in the field of autism, education and intervention development on the: (a) application of the fPRC to students with ASD in mainstream elementary schools; and (b) the content, delivery and feasibility of the school-based intervention.

Methods

Participants and recruitment

Experts were required to have at least 5 years (full time equivalent) experience in the last 10 years engaging with school-aged students with ASD or activities related to school-aged students with ASD. For this study, school-aged students with ASD referred to children aged between 4 and 18 years of age with a diagnosis of ASD as classified by the DSM 5 (American Psychiatric Association, 2013) or a diagnosis of Autism, Asperger's or Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS) as classified using DSM IV criteria (American Psychiatric Association, 2000). Activities related to engaging with school-aged students with ASD may have included the provision of clinical services, research, academic teaching or resource development where approximately 50% or more of the professional activity related to students aged between 4 and 18 years with ASD. Ethics approval for this study was obtained from Curtin University Human Research Ethics Committee (HREC 2016-0150). Potential experts were identified from the School of Occupational Therapy, Social Work and Speech Pathology at Curtin University; school-aged disability service providers, members of Speech Pathology Australia, Occupational Therapy

Australia, the Royal College of Occupational Therapists, and pediatric special interest groups; emails to principals of independent public and Catholic Education mainstream elementary schools in the Perth Metropolitan area and convenience sampling through professional networks of the research team. Some recruited experts were also asked to identify other potential experts. Once identified, experts were emailed an invitation to participate in the study with eligibility criteria and an information sheet.

Procedures

The primary author of the study facilitated the Delphi in collaboration with all other authors. All Delphi rounds were piloted with individuals with relevant experience to check the clarity of questions and response burden. Two Delphi rounds were conducted between February and May 2018. Round one involved open-ended and closed questions. Round two involved mostly closed questions. For closed questions, experts were required to rate their level of agreement or importance of items on a 5-point Likert scale. Experts who responded "neutral", "disagree", "strongly disagree", "of little importance" or "not important" to any of the questions were asked to provide their reasoning. Experts received a personalized link to the survey online via email. Experts were provided with study details, the definition of consensus in the first survey and were required to confirm consent prior to accessing the rest of the survey. Each survey was accessible for 3 to 5 weeks and took up to 30 minutes to complete. A reminder email was sent to experts yet to complete surveys one week prior to the due date. Following the first round, experts were sent a personalized link to the second survey round with quantitative and qualitative results. Experts were encouraged to contact the primary author if they had any feedback, queries or concerns. Following round two, experts were sent a summary of results and informed that a third and final round was not required, as consensus had been reached. Experts were also sent a document that outlined how findings would inform the development of the school-based intervention (see Figure 2).

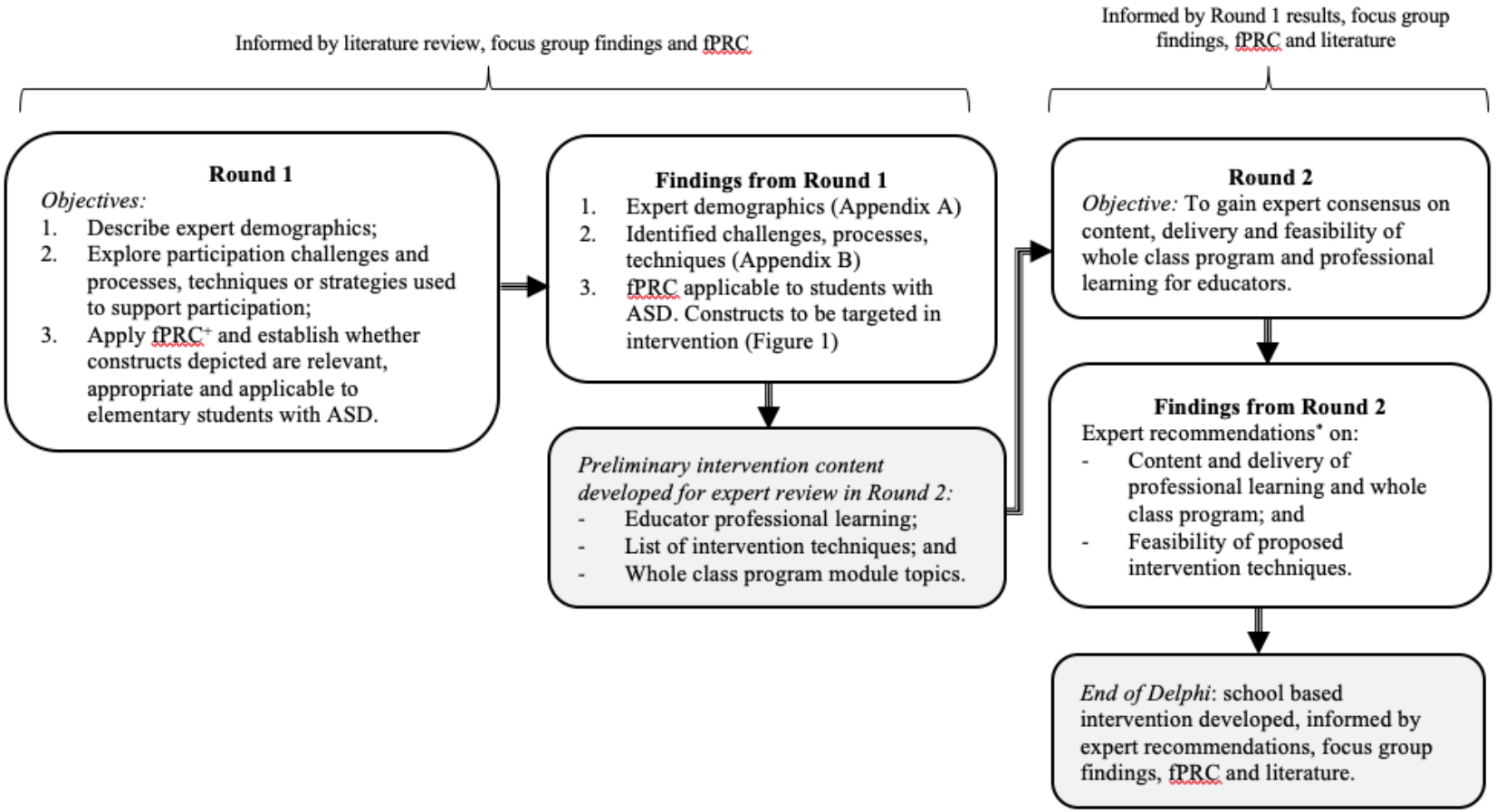

Figure 2: ***Schematic illustration of Delphi process.*** *+Experts provided with fPRC reference document (Appendix B). *See results section for more details.*

Data Analysis

Quantitative and qualitative approaches were used to analyze survey responses. Survey responses were anonymized and imported into the Statistical Package for the Social Sciences (SPSS) prior to analysis. Criterion used for establishing consensus was determined prior to the study based on Delphi literature (Diamond et al., 2014). Consensus was reached when at least 70% or more of experts selected “agree” or “strongly agree” or “important” or “very important” on Likert scale questions (i.e., a median score of 1 or 2 on a 5 point Likert scale and an inter-quartile range (IQR) of 1) (Miller, 2006).

Participant responses to open questions were analyzed using conventional qualitative content analysis (Graneheim & Lundman, 2004). This process involved identifying meanings in participant comments and coding each comment by assigning a descriptor. For example, “I would like to see effective teacher training… a true understanding of the autistic experience is required to effectively accommodate students on the spectrum” was assigned the descriptor “importance of professional learning to increase understanding of ASD”. Participant comments with similar descriptive codes were grouped. These descriptive codes were considered alongside quantitative data in an Xcel spreadsheet to help develop subsequent survey rounds and identify reasons for lack of consensus. Data analysis was conducted by the primary author who was blinded to the identity of experts to minimize bias and maximize the validity of findings. All results were reviewed by other authors.

Methods to ensure trustworthiness were employed in all stages of the research (Liamputtong, 2017). Credibility was enhanced through member checking to test findings and interpretations with experts. Transferability was met through provision of a detailed description of expert demographics and results. Dependability was achieved through use of an audit trail, field notes and reflexive journal throughout the research process and

confirmability through a description of the specific approach used to analyze, organize, describe and report on themes within the data set (Curtin & Fossey, 2007).

Results

Expert Demographics

A total of 122 experts responded to invitations and were sent a link to the first survey. Of the 122 invitees, 25 (20%) did not respond and 20 (16%) experts stated that, due to time constraints or life circumstances, they were no longer able to participate. Experts who did not complete the first survey were excluded from the second survey. Seventy-six experts completed round one and 65 completed round two (87% response rate). The panel consisted of clinicians, educators, researchers, and school aged service providers that had at least five years' experience working with students with Autism or in the Autism field. The majority of participants were employed in the education sector (33%), by a service provider (36%) or in a university (26%). Sixty-two (62%) percent of participants had more than 10 years working experience (see Appendix A). There are no strict sample size requirements for Delphi studies; however, literature suggests a panel of 10 to 15 experts can yield sufficient results if the backgrounds of experts is homogenous (Skulmoski, Hartman, & Krahn, 2007).

Round One

Identified challenges and effective supports to promote the school participation of students with ASD.

Experts identified a number of student and environmental challenges impacting the school participation of students with ASD in mainstream elementary schools. Examples of student specific challenges included restricted social communication skills, difficulty managing change, transitions and behaviors, which make students vulnerable to bullying. Examples of environment specific challenges included lack of acceptance and understanding of differences, leading to the behaviors of students with ASD being misinterpreted. Due to

significant overlap in participant responses to processes, techniques and strategies to promote the school participation of students with ASD, these responses have been analyzed and reported together (see Appendix C). Identified intervention techniques were analysed alongside focus group findings and empirical literature to form a categorised list of intervention techniques that experts rated for feasibility in round 2.

Application of the fPRC to the participation of students with ASD.

The majority of experts (87%; median, 2; IQR, 1) agreed that the fPRC could be applied to students with ASD in mainstream elementary schools. Intrinsic student factors were all deemed important for the school participation of students with ASD. Consensus was achieved on the application of all relationships in the fPRC to students with ASD, with at least 91% of experts agreeing or strongly agreeing with these statements. Ninety-one percent (median, 2; IQR, 1) of experts agreed with authors that there is a bi-directional relationship between students with ASD preferences and activity competence (e.g., students with ASD that have an interest in a subject area, may spend more time on that subject and therefore gain more skills), where in the fPRC exists a uni-directional relationship (Imms et al., 2016). All experts (100%; median, 1; IQR, 1) agreed that school connectedness is important for the participation of elementary school students with ASD and should be considered within the fPRC, as an additional intrinsic student factor impacting students' school participation. Only 23% (median, 3; IQR, 0) of experts strongly agreed or agreed with the statement "school connectedness is already addressed in the Australian school curriculum". Experts who agreed with this statement had varying professional roles and reported they felt school connectedness is addressed in the health curriculum and anti-bullying programs. Experts who disagreed with this statement reported that school connectedness is not a priority for schools as an emphasis is placed on students' academic performance and noted a lack of time and resources as barriers to addressing school connectedness (see Table 1).

Table 1.

Summary of Quantitative Results from Round One (N = 76)

Item	Response					Agreement (%)	Mdn	IQR
	SA *(1)*	**A** *(2)*	**N** *(3)*	**D** *(4)*	**SD***(5)*			
Do you agree that the fPRC can be applied to elementary school students with ASD in mainstream schools?	20	45	8	2	0	87	2	1
School connectedness should be considered as a separate and additional element under involvement.	20	38	13	3	1	77	2	1
School connectedness is already addressed in the Australian school curriculum.	1	16	45	11	2	23	3	0
Student preferences influence and are influenced by school participation.	33	40	1	1	0	97	2	1
Students' sense of self influences and is influenced by school participation.	44	26	3	1	1	93	1	1
Students activity competence influences and is influenced by school participation.	33	39	1	2	0	96	2	1

Students preferences influence and is influenced by sense of self.	44	28	3	0	0	96	1	1
Students' sense of self influences and is influenced by activity competence.	33	37	3	2	0	93	2	1
**Proposed new relationship - Student preferences influence and are influenced by activity competence.	35	33	5	2	0	91	2	1
There is currently a gap in the way these intrinsic student factors are addressed in mainstream elementary schools.	25	29	18	3	0	72	2	2

	VI *(1)*	**I** *(2)*	**N** *(3)*	**LI***(4)*	**NI** *(5)*	**Agreement (%)**	**Mdn**	**IQR**
How important do you think school connectedness is for the participation of elementary school students?	52	23	0	0	0	100	1	1
How important are [preferences] for the school participation of students with ASD?	57	17	1	0	0	99	1	1
How important is [sense of self] for the school participation of students with ASD?	56	17	2	0	0	97	1	1

How important is [activity competence] for the school participation of students with ASD?	35	27	10	3	0	83%	2	1
How important is [attendance] for the school participation of students with ASD?	37	32	6	0	0	92%	2	1
How important is [involvement] for the school participation of students with ASD?	53	21	1	0	0	99%	1	1

Note. To reach a consensus, 70% of experts needed to rate 'strongly agree' or 'agree' and 'very important' or 'important'. Percentage agreement: the percentage of experts who selected 'agree' and 'strongly agree' or 'important' and 'very important'. Response scale: 1 = Strongly Agree (SA)/ Very Important (VI), 2 = Agree (A)/ Important (I), 3 = Neutral (N), 4 = Disagree (D)/ Of Little Importance (LI), 5 = Strongly Disagree (SD)/ Not Important (NI). Median (Mdn): The value that separates the higher half of responses from the lower half (i.e., the middle value). Inter-quartile range (IQR): The middle 50% of the data (i.e., the difference between 75th and 25th percentiles)

Round Two

Content, delivery and feasibility of the school-based intervention.

Table 2 outlines a summary of quantitative results relating to the feasibility of proposed intervention techniques and the level of importance of proposed weekly classroom module topics. See Appendix D for a brief description of proposed weekly classroom module content. All experts (100%; median, 1; IQR, 0) agreed or strongly agreed with the statement "improving the school participation and school connectedness of elementary school students with ASD is important enough to warrant the development of a school-based intervention".

Whole class program.

Experts recommended the whole class program be delivered in 60 minutes (mean, 72 minutes; range, 0 – 180 minutes) in several short sessions across the school week. Experts emphasized the importance of the intervention being embedded into naturally occurring classroom activities and routines to allow for opportunities for incidental teaching. There was a relatively even spread of responses related to the length of time the classroom program should be delivered across: 31% of experts responded across one term; 22%, across two terms; and 32%, across a school year. Experts reported that ideally the intervention should be delivered over a longer period of time, however, acknowledged this may limit feasibility.

Experts reached consensus with more than 70% of experts agreeing that proposed weekly classroom module topics were "important" or "very important" to be included in the school-based intervention (see Table 2). Experts emphasized the importance of linking content to state and national curriculum to maximize the intervention's feasibility and suggested the proposed content aligned best with health.

Sixty-six (66%) percent of experts felt the school-based intervention should include an optional classroom module specific to ASD. While some experts felt it would not be helpful to label students' disability, others provided examples of where talking about ASD

helped to build understanding and support for the student with ASD in the classroom. Experts recommended the professional learning and intervention manual include information for educators and schools on how to manage potential challenges in delivering this content.

Experts reached consensus on the feasibility of all intervention techniques, with at least 77% of experts reporting proposed intervention techniques to be "feasible" or "very feasible" in the school environment (see Table 2). Qualitative comments focused on the practical implementation of techniques. Experts preferred whole class rather than individual techniques as they felt this would minimize burden and the risk of individual students being singled out. Experts also suggested the implementation of intervention techniques, such as video modelling, would depend on the availability of school resources.

Educator professional learning.

Experts recommended professional learning be delivered to educators over a total of seven hours (range 0 – 10), in three sessions (range 0 – 10), across five days (median, 3; range, 0 – 14). Experts preferred content to be delivered face to face (69%), in workshop style (91%) and supplemented with written information (46%). Only 39% of experts reported they would prefer professional learning to be delivered online. The majority of experts agreed with proposed professional learning content. Experts suggested content should: a) be individualized to suit the needs of specific schools; b) focus on how the school-based intervention can be practically incorporated into the school day; c) include practical demonstrations of specific intervention techniques; and d) emphasize potential benefits of the intervention to all students (not just students with ASD). Experts stressed the importance of ongoing professional learning and support before, during and after the intervention. Experts suggested support could be available from the researcher via email and onsite at the school at key points during the intervention; utilizing a coaching framework where support is gradually reduced over time to increase capacity of schools and individual teachers.

Table 2.

Summary of Quantitative Findings from Round Two Relating to the Feasibility of Proposed Intervention Techniques and the Importance of Proposed Weekly Classroom Modules (N = 65)

F*easibility of* **proposed intervention techniques to implement in school environment**	**Response**					**Agreement (%)**	**Mdn**	**IQR**
	VF *(1)*	**F** *(2)*	**N** *(3)*	**NF** *(4)*	**ANF***(5)*			
Role play	29	29	6	1	0	90	2	1
Video modelling	32	30	2	1	0	95	2	1
Peer modelling	32	28	4	1	0	92	2	1
Teacher modelling	38	23	2	2	0	94	1	1
Cognitive behavioral therapy techniques	22	28	7	8	0	77	2	1
Task adaptation	44	19	2	0	0	97	1	1
Environmental adaptation	49	15	1	0	0	98	1	1
Incorporation of structure and routine	45	18	2	0	0	97	1	1
Incorporation of student interest and preferences	27	35	3	0	0	96	2	1
Use of play as therapeutic medium	23	30	10	2	0	81	2	1
Parental involvement for generalization of skills	27	31	6	1	0	90	2	1

Peer mediated intervention, at an individual student level	20	33	9	2	1	82	2	1
Peer mediated intervention, at a whole class level	19	36	8	2	0	84	2	1
Self-management techniques, at an individual student level	22	28	14	1	0	77	2	1
Self-management techniques, at a whole class level	27	31	6	1	0	90	2	1
Differential reinforcement, at an individual student level	23	33	4	5	0	86	2	1
Differential reinforcement, at a whole class level	38	20	5	1	1	90	1	1
Perceived level of importance of proposed weekly classroom module topics.	**VI** *(1)*	**I** *(2)*	**N** *(3)*	**LI** *(4)*	**NI** *(5)*	**Agreement (%)**	**Mdn**	**IQR**
Who am I and where do I fit in at school?	41	22	2	0	0	97	1	1
We are all unique	44	19	1	1	0	97	1	1
What is ASD?	28	30	5	2	0	89	2	1
Being part of my class	36	25	4	0	0	94	1	1
Thinking about others	49	16	0	0	0	100	1	0.5
Staying calm at school	42	20	3	0	0	96	1	1
Learning through the senses	25	32	6	2	0	88	2	1
Being a good learner	25	34	5	1	0	91	2	1

Making friends	45	18	2	0	0	97	1	1
Having conversations	32	28	5	0	0	92	2	1
Play at break time	44	19	1	1	0	97	1	1
Managing change and transitions	39	23	3	0	0	95	1	1
Managing conflict	48	15	2	0	0	97	1	1
Being part of my school	35	25	2	3	0	93	1	1

Note. To reach a consensus, 70% of experts needed to rate ‘strongly agree’ or ‘agree’ and ‘very important’ or ‘important’. Percentage agreement: the percentage of experts who selected “agree” and “strongly agree” or “important” and “very important”. Response scale: 1 = Very Feasible (VF)/ Very Important (VI), 2 = Feasible (F)/ Important (I), 3 = Neutral (N), 4 = Not Feasible (NF)/ Of Little Importance (LI), 5 = Absolutely Not Feasible (ANF)/ Not Important (NI). Median (Mdn): The value that separates the higher half of responses from the lower half (i.e., the middle value). Inter-quartile range (IQR): The middle 50% of the data (i.e., the difference between 75th and 25th percentiles)

Discussion

Given the numerous challenges with developing and implementing school-based interventions (Kasari & Smith, 2013), involvement of expert stakeholders in intervention development is crucial. This study represents an important step towards bridging the gap between research and practice in the field of school-based intervention research.

The Importance of a Strong Theoretical Rationale in Intervention Research

One of the main outcomes of this study was reaching consensus on the use of the fPRC as a theoretical framework for the intervention. This is an important finding, as despite increased emphasis on the use of evidence-based interventions in schools , there continues to be widespread implementation of interventions that lack a strong theoretical rationale or that have minimal evidence to support their effectiveness (Odom, Collet-Klingenberg, Rogers, & Hatton, 2010). To effect change in the school participation of students with ASD, experts agreed that the intervention must adhere to the following principles: a) target the range and diversity of activities that students attend (i.e., attendance); b) target students' experiences of participation while attending school (i.e., involvement); c) address intrapersonal student factors related to confidence, satisfaction, self-esteem and self-determination (i.e., sense of self); d) address students' skills in areas limiting participation, such as social communication (i.e., activity competence) and interests or activities that hold meaning to the student (i.e., preferences). The process of gaining expert consensus on the theoretical rationale of the intervention helped to provide conceptual clarity and consistent use of terminology for researchers and experts. It was also important in ensuring the intervention targets constructs of interest; that clear research questions are developed, and appropriate outcome measures are selected to test the interventions effectiveness. Most importantly, the application of the fPRC ensures the intervention has a strong theoretical rationale, which will allow researchers to clearly articulate how and why they think the intervention is likely to work.

School Connectedness is an Underemphasized Factor Impacting Student Participation

Despite evidence emphasizing the significant impact school connectedness has on student outcomes (Shochet et al., 2006), only 23% of experts reported that school connectedness is currently addressed in the curriculum. Experts attributed this to a focus on academic performance to the exclusion of efforts to support students social, emotional and behavioral functioning; a notion that has been supported in literature (Bonell et al., 2014). These findings highlight the importance of increasing educators' understanding of the impact school connectedness has on students' social and emotional development, but also their academic outcomes (McNeely, Nonnemaker, & Blum, 2002). By supporting students to feel respected, accepted and included at school, students are more likely to participate and have opportunities to demonstrate their academic abilities (Bonell et al., 2014). These findings highlight an unmet need in elementary schools and the imperative to develop school-based interventions that support educators to promote connectedness in the early school years.

Active Ingredients of the School-Based Intervention Based on Expert Recommendations

Quantitative and qualitative findings from this study clearly demonstrate that interventions adopting whole class approaches are of value in school settings. Based on expert recommendations, the classroom program, developed as a result of this study, will focus on incorporating peer mediated intervention techniques at a whole class level to increase students' capacity to recognize and respond when a peer needs help to participate at school. Peer mediated intervention has emerging evidence to support its effectiveness with students with ASD and is well suited to the school environment, as it provides multiple and varied opportunities to practices skills in natural environments (Chang & Locke, 2016).

The provision of high-quality professional learning and ongoing support for educators was another key recommendation from experts. Findings from this study highlight that educators often feel unequipped and unsupported to implement interventions, which limit

their feasibility. Experts' recommended professional learning adopt a practical, hands-on approach by providing educators the opportunity to: a) apply content to specific classrooms or students (e.g., by discussing how lesson plans can be incorporated into the classroom schedule), b) troubleshoot perceived barriers (e.g., the impact student absences or presence of relief teachers could have on educators ability to deliver the intervention), and c) practice intervention techniques such as video modelling (e.g., using role play and feedback with other educators in professional learning sessions). Rather than traditional methods of professional learning that focus on disseminating content-heavy lectures, expert educators in this study value the opportunity to practice, apply their skills and receive ongoing coaching in the school environment to refine their skills. Experts emphasized that the success of an intervention is dependent on involvement and support from administration staff (e.g., principals and learning support coordinators); a notion supported in a study which identified school principals to be important facilitators to intervention implementation (Forman, Olin, Hoagwood, Crowe, & Saka, 2008). These findings emphasize the importance of, not only providing adequate professional learning and support to educators, but also the importance of engaging *whole schools* in intervention implementation to maximize their feasibility.

The complex nature of school environments and the large number of factors that can impact on the successful implementation of school-based interventions was highlighted in the findings of this study. For example, experts felt the delivery of an ASD specific module should be considered on a case-by-case basis, due to the unique experiences of students on the spectrum and the variable nature of individual classrooms. Experts also felt professional learning should be tailored to suit specific needs of educators and schools by assessing prior level of knowledge and skills, using a self-report questionnaire prior to the training.

While useful recommendations, findings highlight the incongruence between educator preferences and the need for rigorous methodology in intervention research. This presents a

challenge for researchers who need to ensure intervention fidelity, which requires consistency in the way the intervention is delivered at school (Jaycox et al., 2006). The complex challenges associated with implementing interventions in schools may explain why most intervention studies are not carried out in schools (Kasari & Smith, 2013). The context in which interventions are implemented and measured is important. Researchers, need to work collaboratively with educators to lessen the gap between research and practice.

In summary, based on expert recommendations, the intervention developed as a result of this study will include: a) a whole class, peer mediated, curriculum embedded classroom program to be facilitated by the classroom teacher; b) professional learning and ongoing support for educators; and c) active involvement of parents through invitations to participate and weekly information handouts with generalization activities to support learning. These key components or active ingredients are essential and must be present for the intervention to work. In highly variable settings, such as schools, "…it is not enough to identify an active ingredient without also identifying the ways in which implementation of the ingredient can vary while maintaining its effectiveness" (Kasari & Smith, 2013, p. 4). The intervention will therefore be manualized; highlighting key components that must be present for the intervention to work, as well as acceptable variance. Opportunities for individualization are particularly important, not only to meet the needs of educators described in this study, but also to meet the unique needs of students with ASD who often experience variability in their ability to participate and feel connected at school. By developing an intervention in consultation with expert stakeholders, implementing and evaluating the intervention in schools from the outset; we have the opportunity to maximize the appropriateness of the intervention, increase educator buy-in and therefore the success of the intervention.

Limitations

While there are benefits to using the Delphi technique, there are known limitations to this methodology (Giannarou & Zervas, 2014; Mullen, 2003). Experts who volunteered to participate may be highly motivated, which may have biased results. While multiple international experts were invited to participate, only four completed both survey rounds. Further research is required to generalize findings in the international context. Finally, authors sought expert opinion on the application of a pre-determined theoretical framework, which may be considered confirmatory bias. Authors felt participant expertize would be best utilized in understanding the complex factors shaping student school participation and gain feedback on the content, delivery and feasibility of the intervention based on their experience. Authors attempted to minimize the impact of these limitations by: ensuring an even spread of experts from a range of professional backgrounds; minimizing participant fatigue by limiting the number of rounds and minimizing wait times between rounds (Hsu & Sandford, 2007).

Conclusions

Findings from this study suggest to effect change in the participation of students with ASD, school-based interventions need to address students' attendance, involvement, sense of self, activity competence, preferences and sense of school connectedness. A school-based intervention that includes a whole class program, professional learning and parent involvement will be developed and evaluated to improve the school participation and connectedness of elementary students with ASD; informed by theoretical and empirical literature, the fPRC, focus group and expert panel findings. The process of gaining expert perspectives to develop an evidence-based intervention, with known active ingredients, provides greater confidence that the intervention will be effective in achieving meaningful outcomes for students with ASD.

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Appendix A

Demographic Characteristics of Experts

	Round 1		Round 2	
Characteristic	**Frequency**	**Percentage (%)**	**Frequency**	**Percentage (%)**
Location of residence	**n=76**		**n=65**	
Australia	72	95	62	95
United States	1	1	1	2
United Kingdom	1	1	1	2
Hong Kong	2	3	1	1
Australian State	**n=72**		**n=62**	
Western Australia	54	71	45	73
Victoria	6	8	6	10
Tasmania	1	1	1	2
New South Wales	5	7	4	5
Queensland	6	8	6	10
¨**Sector employed**	**n=86**		**N=73**	
Service Provider	27	36	23	32
Education Sector	25	33	21	28
Private Practice/ Small Business	6	8	5	7
University	20	26	19	26
Currently a student	4	5	3	4
Government or non-government agency	2	3	0	0

Other	2	3	2	3
¨**Professional role**	**n=101**		**n=84**	
Teacher	19	25	16	19
Principal	3	4	3	4
Deputy Principal	2	3	2	2
Learning Support Coordinator	5	7	3	4
Education Assistant	5	7	4	5
Speech Therapist	16	21	14	17
Occupational Therapist	26	34	23	27
Psychologist	2	3	1	1
Case Manager	3	4	2	2
Researcher/ Academic	14	18	12	14
School-Aged Service Provider	2	3	1	1
Other	4	5	3	4
Completed qualifications	**n=76**		**n=65**	
Certificate	2	3	1	2
Diploma (or equivalent)	2	3	2	3
Bachelor (or equivalent)	37	49	33	51
Masters (or equivalent)	14	18	11	17
PhD (research)	15	20	15	23
Other, please specify	6	8	3	4
Years of working experience	**n=76**		**n=65**	

2 – 3 years	1	1	1	1
4 – 5 years	3	4	3	5
6 – 7 years	12	16	10	15
8 – 9 years	13	17	11	17
>10 years	47	62	40	62
Years of experience with students with ASD	**n=76**		**n=65**	
5 – 7 years	33	43	31	48
8 – 9 years	8	11	6	9
10 – 11 years	5	7	5	8
12 – 13 years	9	12	7	11
14 – 15 years	4	5	2	3
16 – 17 years	2	3	2	3
18 – 19 years	4	5	1	1
>19 years	11	15	11	17

Notes. ¨ Indicates multiple responses were allowed

Appendix B

NB. Hold your mouse over (do not click) areas of the table marked with * for further information.

Reference document with definitions of key constructs of the fPRC and their application to mainstream school and students with ASD, to assist experts in responding to questions in round one.

Construct	Definitions according to Imms et al. (2016)	Application to mainstream school	Example of application to students with ASD. *NB. Information sourced from literature and focus groups and may not apply to all students with ASD*
Participation	Attending and being involved in life situations[a]	Attending and being involved in school situations*.	
Attendance	Being there and measured as frequency of attending and/or the range or diversity of activities in which an individual takes part.	Students turning up for school, being present in the classroom, attending school activities and extra-curricular activities.	• Higher rates of absenteeism, suspension and exclusion[2]; • More likely to be homeschooled[3]; • More frequent changes in schools[4]; and • Spend more time outside of the classroom than peers[5].
Involvement	The experience of participation while attending that may include elements of engagement, motivation, persistence, social connection and affect.	The students experience of participation while attending school*.	• Perceive participation to be lower[6]; • Report feeling more bullied, less liked, less involved in interaction and less understood by teachers[6]; • Report greater loneliness[7]; and • Experience poorer peer relationships and are more vulnerable to social rejection and bullying than peers[8].

Construct	Definitions according to Imms et al. (2016)	Application to mainstream school	Example of application to students with ASD. *NB. Information sourced from literature and focus groups and may not apply to all students with ASD*
Preferences	The interests or activities that hold meaning or are valued.	Student interests or activities that hold meaning or are of value to the student*. Preferences are established through interactions with people, past experiences at school and through positive associations with the school environment.	• Often have previous negative experiences at school leading to reduced motivation, satisfaction and confidence[9]; • Often show a strong preference for routine and predictability which can cause anxiety at school[10]; • Sometimes prefer visual learning and respond well when information is presented visually; and • Behavior and interests can disrupt school participation and lead to peer rejection[9].
Activity competence	The ability to execute the activity being undertaken according to an expected standard, which includes cognitive, physical and affective skills and abilities. Activity competence can be measured as capacity, capability or performed skill.	The student's ability to execute an activity being undertaken according to an expected standard at school*.	Students with ASD: • Spend more time engaged in solitary behaviors, purposeless or no activity[11]. • Report difficulties with handwriting and academic workload[12]. • Require a high level of support from education assistants[13]. • Have difficulties with executive functioning skills[14].

Construct	Definitions according to Imms et al. (2016)	Application to mainstream school	Example of application to students with ASD. *NB. Information sourced from literature and focus groups and may not apply to all students with ASD*
			• Can be hesitant to participate without direction or prompting[5].
Sense of self	Intrapersonal factors related to confidence, satisfaction, self-esteem and self-determination.	Intrapersonal factors related to confidence, satisfaction, self-esteem and self-determination when participating in school work and related school activities.	Students with ASD: • Report lower levels of self-esteem, mental health difficulties and suicidal feelings and self-harming behavior[4]. • Often experience a negative perception of differences and have a desire to fit in[5].
Context	Setting for activity participation that includes people, place, activity, objects and time [b]	People, places, activities, objectives and time related to school environment. Factors influencing school participation*.	• Busy classrooms, lack of structure during break times and constant transition and change throughout the day can make school a stressful place for students with ASD[5]. • Reported barriers to school participation for students with ASD include:

Construct	Definitions according to Imms et al. (2016)	Application to mainstream school	Example of application to students with ASD. *NB. Information sourced from literature and focus groups and may not apply to all students with ASD*
			- Lack of in-service ASD specific teacher trainin[15,16]; - poor school culture relating to the inclusion of students with additional needs[9, 18]; - lack of peer and teacher awareness and understanding of ASD[2, 4, 20-23] and - a lack of modification to the curriculum, social and physical environment[4].
Environment	Broad, objective social and physical structures in which we live.	Students' sit within the context of their family and broader community environment. Family factors influencing school participation*. Community factors influencing school participation*.	Parents of students with ASD: • perceive their child to have restricted participation and disrupted educational trajectories[9]. • often actively try to influence their child's school participation but feel they have little control[9]. • are often forced to relinquish employment to home school their child or be available to support their child at school placing additional financial pressure on the family[9]. • There is still a general lack of understanding of ASD in the broader community caused by misinformation,

Construct	Definitions according to Imms et al. (2016)	Application to mainstream school	Example of application to students with ASD. *NB. Information sourced from literature and focus groups and may not apply to all students with ASD*
			misleading stereotypes and negative stigma associated with ASD.

[a] Based on the ICF definition (World Health Organisation, 2007); [b] from Batorowicz et al., (Batorowicz, King, Mishra, & Missiuna, 2016)

Note. References are detailed at the end of the Qualtrics survey.

Appendix C

Summary of identified challenges, processes or techniques and useful strategies identified by expert experts in Round 1

Student specific challenges	• Social skills. • Self-regulation. • Transitions and change. • Executive functioning. • Communication skills. • Intrinsic motivation. • Behavior, which makes student vulnerable to bullying.
Environment specific challenges	• Highly social, stimulating and at times unpredictable nature of the school environment. • Lack of knowledge and skills about ASD. • Lack of adaptation to support individual student needs. • Lack of flexibility within the curriculum to support individual learning styles. • Lack of time and resources. • Lack of acceptance and understanding of difference leading to students with ASD being misunderstood. • Strained relationships between stakeholders including parents, clinicians and educators. • Negative attitudes towards inclusion and students with additional needs.
Processes, techniques and strategies to promote school participation of students with ASD	• Professional learning and support for educators. • Parent support and education. • Individualized planning for students with ASD. • Use of formalized social thinking and self-regulation programs. • Task and environmental adaptations including use of visual supports. • Explicit teaching of skills (e.g., social skills, self-regulation) • Peer mediated intervention, peer support and mentoring.

	• Strengths based approach (i.e., incorporating strengths and interests wherever possible). • Video-modelling. • Peer and teacher modelling. • Whole class or whole school approaches. • Choice and control. • Opportunities for structured support during break times. • Positive reinforcement. • Break systems and incorporating regular breaks throughout the day. • Communication and collaboration between stakeholders. • Collaborative goal setting with students and parents. • ASD specific information to raise awareness and understanding. • Focus on building student empathy. • Focus on supporting relationships between home and school. • Utilization of supports including school resources and external agencies.

**Note, due to significant overlap, participant comments related to processes, techniques and strategies to promote school participation of students with ASD have been analyzed and reported together.*

Appendix D

Proposed weekly classroom modules with description to be used as a guide

Who am I and where do I fit in at school? *Identify personal strengths, interests, friends and supports at school; self-evaluate feelings towards school, satisfaction and performance in key areas; set goals for school participation.*
We are all unique *Recognize that everyone is different; connect with peers with similar strengths and differences; create difference.*

What is ASD? *Characteristics of ASD; misunderstanding and myths; strengths and successful people with ASD; potential difficulties at school; how to help.*
Being part of my class *Recognize the role and power everyone has to help others to participate; identify qualities of a class citizen; develop a set of classroom expectations to support participation; practice strategies in being assertive when someone is not inclusive*
Thinking about others *Learn how to recognize when a peer may need help at school by using their body language, tone of voice, thoughts, feelings and actions.*
Staying calm at school *Recognize that everyone responds differently to emotions at school, develop individual self-regulation plans; establish a whole class break communication system; practice self-regulatory techniques.*
Learning through the senses I*dentify and recognize differences in sensory preferences and learning styles; discuss and implement adaptations to the classroom to support learning.*
Being a good learner *Recognize that everyone learns differently; recognize when a peer may need help in class (e.g., to ask for help; to stay on task); learn ways to help everyone learn together.*
Making friends *Recognize that everyone likes to be included and to have someone to call a friend; identify qualities of good friend; practice friendship skills (initiating, joining in, sharing, taking turns).*
Having conversations *Recognize key challenges in conversation; practice conversational skills (asking questions, initiating, staying on topic)*
Play at break time Identify common break times issues and solutions; recognize when a peer needs help at break and learn ways of helping; create structured activities or games for break time as a class.
Managing change and transitions *Discuss common changes and transitions at school and associated feelings; prioritize one*

change/transition that is important to the class; develop strategies to support change/ transition.
Managing conflict *Recognize that conflict is a part of everyday life at school; recognize other people's points of view in a conflict; learn ways to manage conflict.*
Being part of my school *Reflect back to the first module; identify ways to get more involved at school and create new opportunities as a class, revisit vision for the future; celebrate differences within the class and school.*